

The Physical Activity Component of Health Promotion in Occupational Settings

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MOST ADULTS BELIEVE that regular exercise is important for good health, and many also state that their own health would benefit from more exercise (1). This positive attitude by the general public toward the potential health benefits of exercise is consistent with, and probably substantially influenced by, the admonitions of numerous health organizations that regular exercise is important for prevention of chronic disease and rehabilitation (2,3). Available data, however, indicate that a substantial discrepancy exists between the general public's attitudes or beliefs about the health benefits of exercise and their actual exercise habits. Without adjusting for the likelihood of substantial overreporting of actual activity performed, fewer than 30 percent of American adults probably meet the American Medical Association and American Heart Association recom-

mendation of "a good bout of exercise at least three times per week" (1,4).

Continued expansion of the physical activity boom that started in the mid-1970s could result in a substantial change in the exercise profiles of American adults by the early 1980s. Can members of the health profession take advantage of this new interest in vigorous exercise (and associated changes toward a more healthful lifestyle)—demonstrated by a modest but growing segment of the population—and extend it to a sufficiently large proportion of sedentary, working adults so that a measurable change in health status and productivity will result?

To evaluate the potential role of physical activity in employer-employee health promotion programs, our focus here is on the following areas: (a) scientific evidence of health and job-related benefits resulting from increased physical activity, (b) factors contributing to the successful initiation and maintenance of physical activity by adults, and (c) implementation of exercise programs in industrial settings.

Health and Job-Related Benefits of Exercise

The belief that regular exercise provides significant health benefits has existed since the time of Hippocrates. Currently, there are both vocal opponents and

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advocates of the health potential of exercise. Their positions on the subject range from the belief that vigorous exercise is a panacea for all that ails man to the belief that it provides no health benefits and is a hazard to be avoided by every adult. It is evident that truth is to be found somewhere between these two extremes. For selected chronic disorders highly prevalent among the employable portion of our population, exercise can have a unique or synergistic beneficial effect when incorporated into a health promoting lifestyle. As with many other changes in health-related habits, the scientific evidence that demonstrates a cause and effect relationship between a change in the habit and a reduction in the frequency or severity of various health problems still is not definitive and, in some cases, still merely circumstantial. On the other hand, there is substantial evidence that for some health- and job-related conditions, an appropriate increase in the proper exercise by previously inactive adults can produce direct beneficial effects.

Health Benefits of Increased Exercise

Evidence from a variety of sources supports the belief that an increase in habitual physical activity promotes better health. The degree of conviction regarding the relationship between exercise and a specific benefit should depend on the scientific rigor of the studies performed to support the relationship and the reproducibility of the results. The utility of the results depends on their generalizability to a reasonable proportion of the general population if a change in exercise is to contribute significantly to an employee health promotion program. Factors influencing generalizability include the characteristics of the exercise program (type, intensity, amount) and of the study population (age, health status, and so on). A brief review of health benefits ascribed to regular exercise that have some scientific documentation follows.

Exercise and coronary heart disease. The greatest impetus for considering exercise a health modality is its potential role in prevention of heart diseases and rehabilitation. Substantial evidence derived from observational studies demonstrates an association between an active lifestyle on the job or during leisure time and a reduced risk of coronary heart disease morbidity and mortality. More active persons tend to have fewer heart attacks; when they do occur, such persons are older, and the attacks seem to be less severe (5,6). This benefit appears to increase with increasing amounts of exercise and is, at least in part, independent of other established risk factors (7,8). As with every other heart disease risk factor (blood pressure, cigarette smoking, chole-

sterol, and so forth), there still is no definitive evidence that an increase in exercise by previously sedentary persons will result in reduced heart disease morbidity and mortality. It is highly unlikely that an adequate study to answer this question will be completed during the next decade; thus, any decision about the role of exercise in heart disease prevention must be based on less than definitive data.

Exercise may reduce the risk of heart attack by means of favorable alterations of several biochemical or circulatory functions. Some major changes known to occur from exercise that may contribute to a reduction in coronary heart disease manifestations include (a) alterations in fat and carbohydrate metabolism resulting in a more favorable blood lipoprotein profile (9) and thus potentially contributing to a reduced rate of coronary atherosclerosis (10), (b) a reduction in sympathetic nervous system activity (11), resulting in a lower workload of the heart through a decrease in heart rate and, in some persons, a decrease in blood pressure (12), and (c) possibly enhanced electrical stability of the myocardium (13). Current evidence does not support the notion that exercise produces a significant increase in the coronary vascular bed as a result of either enhanced coronary artery size or the development of collateral vessels (14).

Despite the numerous limitations in the studies supporting the potential of exercise in preventing heart disease, it seems justifiable to include exercise as a component of multifactor risk reduction programs. Exercise can help control other established risk factors, it can be implemented at a relatively low cost by a large portion of the employed population, and it also may provide other health- and job-related benefits.

Exercise and weight control. The role of weight control in a health promotion program is discussed in the papers prepared for the National Conference on Health Promotion Programs in Occupational Settings by Foreyt and Gotto. It is generally accepted that excess body weight is associated with increased morbidity and mortality. Changes in body composition (percentage of total weight that is body fat) in adults depend primarily on the balance between calorie intake (food) and calorie expenditure (exercise). Modest amounts of exercise repeated frequently throughout the day can significantly alter a person's energy balance and shift it from positive to negative at no cost for special equipment or facilities. With increasing age there tends to be a small but significant decrease in resting metabolic rate associated with a decrease in muscle mass. Much of this decrease in metabolic rate can be prevented by regular activity of sufficient intensity to retain muscle mass.

Even a 5 percent decrease in metabolic rate with aging can result in the potential for gaining 8 to 10 pounds of body fat per year at the same calorie intake. An increase in habitual activity should be considered a component of all weight maintenance or control programs.

Exercise and psychological status. Much of the research on exercise and its effects on psychological status—especially tension, anxiety, and depression—supports the conclusion that exercise that results in improved physical fitness has psychological benefits for many adults. Exercise has been associated with an improved sense of well-being (15), better sleep patterns (16), and reduced muscle tension (17); it also has been correlated with objective demonstrations of reduced anxiety, depression, and hostility (18). Improvement in psychological parameters in relation to exercise appears to be greatest in persons initially most unfit physically and psychologically (19). The physiological bases for such changes in psychological status have not been clarified, but the known changes in central nervous system activity and reduced circulating catecholamine levels may be a significant factor. Some researchers have assumed that the experience of exercising in a group could provide social-psychological benefits that would assist in stress management, and that an improved self-image might bolster the resources needed to deal with stress and tensions. Also, just the escape from routine job-related tasks to exercise alone or in a social setting, with or without competition, may provide a natural and socially acceptable release from stress or tension.

Howard and colleagues (20) studied the coping techniques used by mid-level managers to handle job-related stress. Participants were asked which of 10 coping techniques they used. They also completed a stress symptom checklist and underwent medical and behavioral evaluations. Those who engaged in physical exercise as a coping technique had fewer stress symptoms than those who did not. This technique appeared to be the third best (of 10) in preventing stress symptoms. These authors concluded that the five best coping techniques were (a) building resistance by regular sleep, exercise, and good health habits, (b) compartmentalizing work and nonwork activity, (c) engaging in physical activity, (d) talking with peers on the job, and (e) withdrawing physically from the stress situation.

Exercise and orthopedic limitations. Inappropriate or unaccustomed exercise, especially running, jumping, or active sports, can cause orthopedic injuries that can be uncomfortable or debilitating, while a progressive

exercise program properly implemented can aid in the rehabilitation of selected orthopedic problems and contribute to the prevention of others. Strength exercises to enhance abdominal muscle tone and stretching exercises to maintain lower back flexibility significantly reduce the frequency of low back discomfort and disability (21). Whether such exercise decreases the likelihood of orthopedic injury during falls has not been firmly established, but increased muscular strength, greater joint flexibility, and enhanced bone density as a result of proper exercise by sedentary adults may provide some protection.

Other health benefits. Because of the numerous biochemical changes that occur during vigorous exercise of large muscles, a variety of health benefits have been ascribed to exercises; however, these benefits are rarely documented scientifically. It has been observed, for example, that exercise decreases blood sugar levels and reduces the need for medication by some diabetic patients and that the arterial blood pressure levels at rest and submaximal exercise are reduced in some normal and hypertensive patients, but there is no evidence that exercise prevents either diabetes or essential hypertension. Also, the notion that exercise may enhance gastrointestinal or sexual functions is speculation, based on subjective observations or wishful thinking. Only further research will provide the answers to these and a variety of other questions that relate exercise to improved health and general well-being. Available data, however, support the inclusion of regular exercise in a health promotion program.

Exercise and job performance. A major benefit of regular physical activity is an increase in physical working capacity (PWC) or physical fitness. PWC is the maximum amount of energy that a person can expend for a short time, and it is expressed in relation to the energy used by a person at rest. If the energy expended at rest is 1 metabolic unit (MET), then 2 METS represent double resting energy expenditure and 10 METS would indicate a 10-fold increase in energy expenditure. With this multiple of the resting energy concept, PWC can be expressed in relative terms: that is, 5 METS is the same relative increase in metabolism for a person regardless of size, age, or sex. Thus, the relative physiological stress of a given physical task can be expressed as the PWC-MET ratio. For example, a task requiring 4 METS represents 50 percent of the capacity of a person who has a PWC of 8 METS, but only 30 percent of the capacity of a person with a PWC of 12 METS.

Since people can work for extended periods (8 hours or more) at no more than 20–25 percent of their

capacity, this PWC-MET ratio is significant. Many sedentary U.S. adults have PWCs of 8 to 10 METS; thus, their sustained working capacity is only 1.6 to 2.0 METS. Standing costs 1.5 METS and using a riding lawnmower costs 2 METS; therefore, many people clearly lack the PWC to engage in even a moderately active lifestyle.

The implication of these foregoing principles is that even people who have moderately active jobs and leisure-time lifestyles need to meet certain PWC standards if they are to avoid chronic fatigue. A reasonable hypothesis might be that an improvement in PWC will result in less general fatigue and a more positive approach to work and, perhaps, life in general.

Much speculation exists about the potential benefit of regular exercise on the job performance of employees in sedentary occupations. Objective documentation of increased productivity as a result of participation in an exercise program has not been performed adequately in the United States. Numerous studies conducted in Germany, Eastern Europe, and the U.S.S.R. have been reported that supposedly demonstrate enhanced job performance of factory or clerical workers as a result of short exercise breaks during the day. Frequently cited are increased productivity and decreased absenteeism associated with increased physical fitness and less job boredom and mental fatigue. When these claims are investigated it appears that they are based on conjecture rather than data. We can find relatively little in the scientific literature on the subject. We conclude that controlled studies are necessary before the issue can be resolved.

Durbeck and colleagues (22) studied the effects of a 12-month exercise training program on three heart disease risk factors, exercise capacity, health attitudes, and job attitudes of 237 male employees of the National Aeronautics and Space Administration headquarters in Washington, D.C. Participants in the employer-sponsored exercise program reported that they could work harder than before—mentally and physically—enjoyed their jobs more, and found their normal work routines less boring. Heinzelman and Bagley, using the same questionnaire as Durbeck (23), reported similar changes in men who participated in an 18-month jogging-type exercise program designed to study the effects of exercise on heart disease risk factors. This study included 239 men from several communities working in a variety of jobs who were randomly assigned to the exercise group and 142 men randomly assigned to a control group. Significantly more men in the exercise group reported increased work performance (60 percent versus 3 percent) and a more positive attitude toward work (40 percent versus 1

percent). Such self-reports of increased work performance as a result of exercise sessions on personal or company time have been reported by others (24,25), but no study has been conducted in the United States that objectively demonstrates increased productivity as a result of exercise program participation.

Some investigators in North America have observed a decrease in absenteeism among employees who participated in an exercise program. Bjurstrom and Alexiou (26) studied the effects of a 5-year heart disease prevention program, primarily an exercise training class, on job performance of 847 men and women employed at the New York State Education Department. Of the 99 participants who completed the first year of the program, 55 percent charged less sick leave during their first year of the exercise program than during the preceding year (36.1 hours versus 66.5 hours). A net reduction of 4.7 hours per employee per year was observed when sick leave data for all participating employees were compared for the control and the program years. Although the findings of this and similar studies (27) tend to support the concept that a more physically fit employee will take less sick leave, none of the studies had the scientific rigor needed to show a cause and effect relationship. The possible self-selection of more healthy employees into the exercise groups or the lack of an appropriate (contemporary) control group are major weaknesses of studies on exercise and job absenteeism. If an employee exercise program did reduce sick leave in the first few months of the year, it most likely would exert its beneficial effect through increased job interest (enhanced social support, reduced boredom, improved mental attitude) rather than sudden substantial improvement in physical health.

Program Initiation and Maintenance Factors

Little systematic research has been conducted to determine which factors influence the initiation and maintenance of exercise programs by adults, compared to other health-related habits such as eating, cigarette smoking, and alcohol consumption. Many principles of behavior change learned from the study of these other habits may apply to implementation of adult exercise programs in industry, but since long-term adherence to supervised to unsupervised exercise has been a major problem for many programs, research is needed on this topic. Much of the data available on factors important for long-term adherence to exercise programs have been obtained by asking participants or dropouts about program characteristics that influenced their participation, rather than by controlled trials in which selected program characteristics are systematically varied and their effects evaluated.

Heinzelmann and co-workers (22,23,28) are responsible for much of the data available on factors influencing recruitment and adherence to supervised exercise programs as a result of their studies on men in an industrial setting (NASA headquarters) and in a community setting. Some of their major findings and those of other studies conducted in industry follow.

Volunteer participation in a supervised exercise program is positively related to level of socioeconomic status. This finding is consistent with the general social learning theory that the more highly educated are more likely to participate in new health-oriented behavior. Certain health behaviors—exercise, weight control, diet—are more likely to be viewed as beneficial by persons in higher social classes than by those in lower social classes. However, persons in higher social classes may simply have more time available to participate in exercise programs, as well as more flexible schedules, than those in lower social classes who are engaged in occupations requiring a more routine and fixed schedule. Thus, there is a need to establish exercise programs that allow flexible times for participation, as well as programs that can be conducted in various employment settings.

People's health attitudes and beliefs can influence their decisions to participate in an exercise program and to adhere to the program over time. Middle-aged men tend to have a positive attitude toward voluntary participation in a program because of (a) perceived vulnerability to disease, especially heart attack, (b) perceived health benefits of exercise, (c) feelings of control regarding their health status, and (d) confidence in health professionals. Efforts should be directed toward identifying and influencing the views of potential participants concerning their personal need for and the benefits of a proposed program. Special attention should be given to the attitudes and beliefs of persons whose views may not be consistent with program participation.

Discussions with small groups during recruitment can enhance the decision to participate as well as the adherence pattern. This recruitment method was systematically compared with the approach of lectures for large groups and was found superior for recruitment and adherence, independent of social or personal characteristics of the audience (23). The active engagement of potential participants in group discussions is more likely to increase understanding and learning than the more passive reception of information obtained from a lecture, and it also provides an opportunity for a person to explore and evaluate the benefits and demands of program participation.

People may be motivated to exercise or participate in a physical activity for reasons other than health. Some persons may decide to participate primarily for health reasons while others may participate because the program provides a change of routine and an opportunity for recreation or social contacts, increases their fitness for other games or sports (skiing, hiking, and so on), or enhances appearance (self-image). Thus, when efforts are made to promote exercise participation, the focus should be diverse and take into account a variety of motivating factors, health-related or not.

Factors influencing a decision to participate in an exercise program frequently differ from factors that influence adherence to the program over time. Motivating factors for participation in an employee exercise program may be a concern for health, a desire for recreation, or a change in routine, while factors such as the organization and leadership of the program, types of activities offered, convenience of participation, and the camaraderie or social support that is generated may be more important in promoting program adherence over time. Since the social aspects can be significant in promoting program adherence, major efforts should be made to ensure that group exercise programs are administered in a manner that supports rather than impedes social development. Wanzel (29) attempted to determine why 480 salaried employees withdrew from a company exercise program. A total of 254 employees (53 percent) who had quit the program responded to a questionnaire that included reasons for withdrawal. Major reasons given for quitting included (a) facility too far from workplace (43 percent), (b) exercise program rearranged participant's schedule too much (40 percent), (c) usual exercise time in the facility was too crowded (14 percent), and (d) medical reasons or injury (18 percent). Since the exercise program was operated during non-work hours, persons who had quit were asked if exercise sessions during office hours, two or three times a week, would have been a suitable alternative to their usual exercise time, and if this would have kept them in the program. Of the 254 respondents, 65 percent answered "yes" to the question, and 78 percent said that this type of scheduling would not decrease their normal office productivity.

Yarvote and co-workers (30) reported their early experience with a medically supervised exercise program for executives of Exxon Corporation. A total of 422 persons were invited to participate in the program, and 309 (73 percent) accepted. When a comparison was made between those who entered the program and those who did not, it was observed from the results

of periodic health examinations that the ones who did not participate were older, smoked more, had higher blood fat levels, higher blood pressure, more heart disease, and poorer treadmill performance. Thus, at least in this instance, those who might have benefited most from the program elected not to participate. If short-term health benefits are to be obtained from exercise programs in industry, recruitment and adherence tactics need to be developed to ensure participation by the higher risk segment of the population.

According to S. N. Blair and co-workers, who surveyed 504 white-collar employees in an insurance company headquarters, several factors were apparently related to the employees' participation in regular exercise (unpublished data from a Liberty Corporation employee health study). Leisure time physical activity (LTPA) was measured by an extensive questionnaire. Factors related to amount of LTPA included age, sex, religion, locus of control, cigarette smoking, and degree of life satisfaction. When only vigorous LTPA was considered, race was also related to amount of activity, but cigarette smoking was not. Factors not related to LTPA included salary level, marital status, type A (hard driving) or type B (less time conscious) behavior patterns, and frequency of attending religious service. Although several factors were significantly related to LTPA, they collectively accounted for a relatively minor portion of the variation in LTPA.

In a recent report of a heart disease intervention program for public employees, Bjurstrom and Alexiou (26) reported that 61 percent of the participants were still in the program at the end of 1 year, a much better experience than reported by many others. The retention rates for years 2 through 5 were 52 percent, 42 percent, 37 percent, and 25 percent, respectively; at year 5, the retention rate was significantly different for men (45 percent) and women (11 percent). Of those who dropped out during the first 15 weeks, 79 percent reported doing so because of lack of interest, including lack or loss of motivation, logistical difficulties associated with the program schedule, or problems encountered with supervisors regarding time for program participation. Another 13 percent dropped out because of physical or medical problems and 8 percent because of changes in job status (transfer, retirement, or change in workload or assignment). During the remainder of the first year, 81 percent of the dropouts were reportedly due to lack of interest; the change of job status reason increased to 18 percent, and medical reasons decreased to 1 percent. Attrition after 1 year of program participation resulted increasingly from changes in job status and decreasingly from lack of interest and motivation, particularly among men. In addition to the decrease

in the percentage of attrition associated with medically related problems, the type of medical problems that caused attrition were more often not attributable to program participation.

Attention should be given to persons who are most likely to influence a potential participant's attitudes and behavior. Often the attitudes and reactions of those with whom a person interacts (wife, co-workers, supervisors, or friends) determine whether that person will participate and adhere to the program over time. These influential persons should be adequately informed about the program and, if possible, be involved in the program on a continuing basis to ensure that their reactions provide social support and reinforcement for the participants. For example, in a study of men exercising under supervision 3 times a week for 18 months, the wife's attitude toward the program was highly related to her husband's adherence. Of the men whose wives had a positive attitude toward the program, 80 percent exhibited good or excellent adherence, in contrast to 40 percent of the men whose wives' attitudes were neutral or negative (23). In the NASA headquarters' study, the supervisor's attitude toward the program was associated with employee adherence to the exercise program (22).

Successful Exercise Program Components

Based on the research cited in the preceding section, behavioral research on related health habits, and the experience of numerous employee exercise programs, certain arrangements or services are important for including long-term participation by a substantial percentage of employees.

An employee exercise program is more likely to succeed if the program is designed to fit the needs, interests, and capacities of the employee and the industrial setting. Careful planning, including development of written objectives and behavioral outcomes, is essential during the early stage. The interests of management and employees in various types of activities should be determined before a program is initiated. The number of employees, their age, sex, educational level, and current health status should be considered as well as certain job characteristics, such as type of occupation, amount of physical activity, and travel schedules.

Following are some components that lead to a successful exercise program. No one program must have all the components, but the more of them that can be appropriately incorporated, the more likely success will be achieved.

Knowledgeable leadership. Regardless of the type of program selected, the most important determinant of

success will be the ability of the program director or leaders to properly inform and help the employees motivate themselves. Good leadership is more important than elaborate facilities or expensive equipment. Without effective leadership the chances that many previously inactive employees will continue any type of program are greatly reduced.

Program promotion. An effective employee education campaign increases the likelihood of program success. The employees need to understand why the employer is offering the program. They need to know the potential benefits of regular participation—if hazards exist, how they proceed to become involved, and what is expected of them in terms of time, equipment, or fees. An education and promotion campaign should be continuous or repeated frequently to achieve maximal effectiveness.

Evaluations. For long-term success, active medical participation is highly desirable. Ideally, an exercise program should be an integral part of the employee health program. Minimal medical approval can be provided by the employee's personal physician. However, several problems exist with this approach: frequently, an employee does not have a personal or family physician; a visit to a physician is an added expense to the employee; and the examination may not be the type needed for clearance procedure. The best approach is for the medical personnel who provide occupational medical services to the employees to conduct any necessary clearance procedures and coordinate their results with the personal physician.

Some form of objective evaluation is required if the program participants are to know how they are progressing. The specific type of evaluation depends on the purpose of the program, but it might include body weight; resting, exercise, or recovery heart rate; simple performance tests; or a more sophisticated medical evaluation. The frequency of these periodic evaluations depends on the time and expense required to administer them, the number of participants in the program, and use of a particular test to determine how rapidly a participant should be expected to demonstrate favorable changes.

Convenience. Exercise programs sponsored by employers can be more successful than many programs sponsored by community agencies, primarily because of their convenience for the participants. A program located at a worksite that includes a shower facility and towel service, as well as a supervised exercise area, can eliminate many of the reasons adults have for not

exercising regularly. They do not have to locate a facility, drive somewhere else, find a parking place, or be concerned about transporting equipment and clothing. All aspects of an employee exercise program should be geared toward convenience and safety so as to obtain optimal participation.

Activity variety. If a variety of physical activities are offered to persons who are considering participation in the fitness program, a much higher recruitment rate will be achieved than if only a single activity is offered. Once in the program, a participant should be able to switch activities to maintain his interest as long as the new activity will fulfill the objectives of his program. Seasonal changes in climate should be considered in program variation.

Recognition for participation. An awards program for regular participation or achievement may be an inexpensive but effective means of motivating people to continue participation. Awards should be given for various levels of achievement or participation, with differences in capacity—sex and age—taken into consideration. The giving of such awards can be based on periodic testing programs or on the documentation of regular performance (number of exercise sessions attended, distance walked, jogged, ran, swam, and so forth).

Implementation in Industrial Settings

Numerous employer-sponsored exercise programs have been initiated in the United States during the past two decades. Some have been highly successful, as determined by participation, subjective evaluation by management and participants, and enhancement of physical fitness. Other programs have been dismal failures. What can be learned from these experiences that will enhance the likelihood of success for current or future programs?

Type of program. A variety of organizational plans have been exhibited by employee exercise programs. Financial support, facilities, time, and personnel have been provided in varying amounts by management, labor unions, and such employee groups as recreation associations. In certain occupational settings, successful programs can be conducted with relatively minimal management involvement; under other circumstances, a much greater commitment by the employer is needed to ensure success.

The minimal level of effort and least expensive program could be one of exercise promotion or education. The objective of this type of program is to encourage increased physical activity by using written materials, movies, and speakers to heighten awareness and to

provide information on how to exercise. Effectively conducted, this approach can enhance many employees' understanding of the value of exercise. Materials such as those provided by the President's Council on Physical Fitness and Sports, Corn Products Company International, and Continental Insurance can help employees begin a program. This type of minimum program probably will not significantly improve the exercise habits of many sedentary employees unless it is supplemented by a more comprehensive effort.

Many possible options exist regarding the organization of company-sponsored programs. Some of the major organizational components to be considered in program planning are:

Supervision—No supervision, company provides only facilities or time, or both. Consultant at rented facility, YMCA, or school. Company provides trained exercise leader

Facilities—A major expense, if not already available. Alternatives—rent YMCA, YWCA, school, club facilities or unused space such as parking garage, storage room, and so forth

Time—Program offered on company time, employee time, or shared time commitment.

These organizational components can be put together in several different ways, according to the employer's objectives and resources. The level of company commitment can range from providing minimal facilities and requiring employees to exercise on their own time to supporting a total program of trained leadership, company time, and complete facilities.

Skilled leadership. We believe that highly trained leadership is the factor that the company should support most strongly. The exercise leader should be well trained in individualized exercise prescription, safety factors and first aid, other aspects of the overall health program, and behavioral techniques to help motivate and maintain participation in the program. Not all persons who purport to be exercise leaders have satisfactory levels of these skills, and care must be taken to obtain the best qualified person. The American College of Sports Medicine (ACSM) has a certification program for exercise program personnel and can provide assistance in exercise leader training and recruitment. The right exercise leader can conduct an excellent program with minimal facilities, but without leadership, the most palatial facility will not produce many long-term changes in sedentary persons.

Facilities. The most important facility that the company can provide is probably a shower and change room. Aerobic exercise can be conducted in numerous

places, including stairwells and hallways. However, it would be better to provide an exercise room. Outdoor jogging or walking trails can be relatively inexpensive for many companies. The ideal provision would obviously be a complete gymnasium with equipment and special exercise rooms, such as squash courts. It is strongly advised that a competent consultant be retained before spending large sums of money on facilities. An experienced ACSM-certified program director would be a good choice. Many companies have wasted money on useless, dangerous, or inappropriate exercise equipment; this mistake can be avoided by obtaining appropriate advice.

Time. A third consideration in organizing a program is when to conduct the exercise sessions. This is not a problem for managerial level employees, who generally have the flexibility to plan their schedules. Many employees who are mostly sedentary and need the program do not have that luxury. Should the program be offered to these persons on their own time, before and after work or during the lunch hour, or should they take time from their work three times a week to exercise? We favor a shared approach, thereby obtaining a commitment from both employer and employee. There are sound behavioral reasons for this method, and it appears to be feasible in many settings.

Costs. In most instances, the decision to have a program and the type of program depend on the available financial support. Consideration should be given to the amount and potential resources for initiation of a program, as well as for its continued operation (supervision, maintenance, and so forth). Financial support from several sources can be combined. Support might be obtained from a special appropriation made by management, the employee health or medical program, labor unions, the employee recreation association, and membership fees charged for participation in the program.

As stated previously, we consider trained, knowledgeable leadership to be the key to a successful program. Salary for a full-time trained exercise specialist with a master's degree and several years' experience probably will be \$15,000 to \$22,000. A part-time specialist may be hired by smaller organizations, or several companies could combine their resources to hire someone to direct a jointly sponsored program (two or more organizations in a building or industrial park). Program costs beyond a program director will depend on the type of program implemented; however, the program can include additional personnel, facilities, educational material, and medical evaluations, as determined by the program design. Since in no study have the economic benefits of employee exercise programs been adequately

evaluated, the cost-effectiveness of various approaches cannot be determined.

Recommendations

1. Exercise programs in industrial settings should be promoted by employee groups, as well as by management. They should be considered an integral part of an employee health benefit program. Their incorporation into basic health services should increase their effectiveness and substantially lower the cost per participant.

2. Support should be provided to public and private agencies to develop guidelines and manuals of operations for employer-employee exercise programs. Included in such resources are the President's Council on Physical Fitness and Sports, the American Association of Fitness Directors in Business and Industry, the American College of Sports Medicine, and the Exercise Committees of the American Heart Association and American Medical Association.

3. Special attention should be given to employees of small businesses that cannot afford to provide the exercise programs or services that are economically feasible for larger business. Guidelines should be established and implemented for the development of contract services to be provided to management and employees of small businesses by local community agencies (YMCAs, YMHAs, schools, and others) or by private enterprise.

4. The major need at this time is more research on various aspects of employee fitness programs. As we have indicated in this report, little objective data exist for judging the effectiveness of existing programs. Future planning will remain speculative unless this deficiency is remedied. Therefore, we make the following specific recommendations: Sources of funding for a greatly expanded research effort should be identified. One possible approach would be to establish a consortium, with government, labor unions, and private industry contributing to a funding pool. These research funds would be disbursed on a competitive basis to support applied research. Requests for proposals (RFP) could be developed by a consultant committee of scientists working in the area. A peer review system similar to that used by the National Institutes of Health and the National Science Foundation should be established to evaluate submissions to RFPs and investigator-initiated proposals. We recommend that these funds be used to support research in the broader aspects of health enhancement, in which exercise programs are integrated with other health promotion efforts. An initial goal of \$50 million is suggested to support this type of research.

Although the list of potential important research topics on employee exercise programs is extensive, some major issues are:

- Development of strategies to motivate the initiation of, and long-term participation in, exercise programs. Special attention should be given to groups that have been slow to adopt sound health behaviors, for example, lower socioeconomic status workers.
- The determination of the type of program organization that is most feasible. Should employees be given time off for exercise? Are group or individualized approaches most effective?
- Make extensive cost benefit analyses. Can exercise programs be effective in meeting stated objectives? Can self-help approaches be effective (thereby reducing costs)? How can exercise programs be best integrated with other health promotion efforts?

Summary

Sufficient data are available that support the health benefits resulting from a physically active lifestyle (especially with accompanying other health-related behavior) to justify the inclusion of exercise as one component of health promotion programs in industrial settings. Exercise programs should be centered around the performance of large-muscle dynamic (aerobic) exercises, because they have the greatest potential for increasing physical working capacity and the prevention or amelioration of atherosclerotic vascular disease, obesity, and selected metabolic disorders. Attention also should be given to strength development and flexibility exercises for the prevention of orthopedic injury and the maintenance of lean body mass.

The health benefits of exercise appear to be related to the increase in the intensity (relative to a person's capacity) and amount (duration times frequency) of exercise, and thus more vigorous forms of exercise seem to result in the greatest improvement in both physical working capacity and health. Performance of vigorous exercise by adults has some cardiovascular or orthopedic risks, but these risks are acceptably small if the participants initiate an exercise program following appropriate guidelines as to medical clearance and exercise performance (guidelines available from the American Heart Association, American College of Sport Medicine, and American Medical Association).

Factors influencing the success of recruiting and maintaining sedentary employees in a more active lifestyle include (a) the involvement of knowledgeable and enthusiastic leadership, (b) a program in which participation is reasonably convenient, (c) adequate instruction on why and how to exercise, (d) provisions for a variety of appropriate activities to meet different needs and interests, (e) support by peers, supervisors, and family for continued participation, and (f) estab-

ishment of short- and long-range goals, with periodic assessment and appropriate recognition or awards.

Many employee physical fitness programs currently exist, and the number is increasing rapidly. The broad objectives of these programs are (a) to save money by reducing employee illness and to increase productivity and (b) to provide a health enhancement service for employees. Currently available data, though meager, suggest that these objectives are being partially met.

The specific exercise program selected for implementation will be successful if it is designed to meet the characteristics of a particular industrial setting. The age, sex, interests, and needs of the employees should be considered, as well as the industrial setting, finances available, and other health-related services. A standard program or set of programs will not meet the needs of the various industries; thus, expert consultation is required if successful long-term programs are to be implemented. With careful planning and the support of the business community, labor unions, employees themselves, and the scientific community physical fitness programs can be improved and expanded to many more U.S. workers.

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